

## CLAIMS

1. A controller for a gas concentration sensor that generates an output correlating with the oxygen concentration in a detected gas, said controller  
5 comprising:

impedance detection means for applying an impedance detection voltage to said gas concentration sensor to detect a device impedance of said gas concentration sensor; and

reverse voltage application means for applying the same voltage as  
10 generated by said gas concentration sensor itself or a voltage that shifts from said same voltage toward an opposite direction against a direction of said impedance detection voltage to said gas concentration sensor for a specified period of time after said impedance detection voltage is applied to said gas concentration sensor.

15 2. The controller for a gas concentration sensor according to claim 1, further comprising reverse voltage application period setup means for increasing said specified period of time with an increase in said device impedance.

3. The controller for a gas concentration sensor according to claim 1,  
20 further comprising reverse voltage application period setup means for decreasing said specified period of time with a decrease in the difference between said impedance detection voltage and the voltage generated by said gas concentration sensor itself.

25 4. A controller for a gas concentration sensor that generates an output correlating with the oxygen concentration in a detected gas, said controller comprising:

impedance detection means for applying an impedance detection voltage to said gas concentration sensor to detect a device impedance of said gas  
30 concentration sensor; and

data invalidation means for invalidating the output of said gas concentration sensor for a specified period of time after said impedance detection voltage is applied to said gas concentration sensor.

5. The controller for a gas concentration sensor according to claim 4, further comprising data invalidation period setup means for increasing said specified period of time with an increase in said device impedance.

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6. A controller for a gas concentration sensor that generates an output correlating with the oxygen concentration in a detected gas, said controller comprising:

impedance detection means for applying an impedance detection voltage  
10 to said gas concentration sensor at specified time intervals to detect a device impedance of said gas concentration sensor; and

impedance detection time interval setup means for increasing said specified time intervals with an increase in said device impedance.

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7. The controller for a gas concentration sensor according to claim 6, further comprising:

output acquisition period setup means for defining time period between the instant at which a specified period of time elapses after the detection of said device impedance and the instant at which said impedance detection voltage is  
20 applied again to said gas concentration sensor as an output acquisition period for said gas concentration sensor; and

output non-acquisition period setup means for increasing said specified period of time with an increase in said device impedance.

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8. The controller for a gas concentration sensor according to claim 6, wherein said impedance detection time interval setup means increases said specified time intervals with an increase in said device impedance within a region where said device impedance is above a predefined threshold value, and ensures, in a region where said device impedance is below said predefined threshold value,  
30 that said specified time intervals are longer than time intervals specified for a situation where said device impedance is equal to said predefined threshold value.